IDENTIFYING HIGH FIRE-RISK AGE GROUPS AND USING NONTRADITIONAL APPROACHES TO DELIVER PREVENTION PROGRAMS

EXECUTIVE PLANNING

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ABSTRACT

The Port Angeles Fire Department lost 50% of its fire prevention division staffing due to budget cuts in 1997. The problem was that the division needed alternative methods to deliver additional fire prevention programs without impacting existing personnel.

The purpose of this research was threefold: 1) identify age groups most vulnerable to fire-related death and injury; 2) recommend program objectives to reduce fire death and injuries for these high risk groups; and 3) determine if outside organizations could assist in efforts to deliver fire prevention programs to this group. The related research questions were:

- What age groups are the most susceptible to fire death and injury?
- What factors influence increased fire death and injury in these groups? and,
- Could nontraditional organizations assist the Fire Department in reducing fire death and injuries for these high risk groups?

The research method was both historical and descriptive including the following procedures: an extensive literature review, a retrospective study of fire casualty records for the

years 1988-1998, a standardized questionnaire for the clients of the Clallam-Jefferson Community Action Council. The research identified the very young 0 - 5 and the over 64 as being most at risk. The retrospective study surprisingly identified adults 30 - 60 as being at risk in Port Angeles. The literature review and the retrospective study also pointed to organizations that could be helpful in delivering fire prevention training and information.

The leading causes of fire related casualties in Port Angeles were smoking and cooking (58% of all casualties). Children playing with matches or lighters and LP-gas were also identified as significant causes (22% of fire related casualties).

This study was the initial effort to bring together data to support community fire prevention planning. The author recommended identifying and working with organizations that currently communicate with the at-risk populations to deliver prevention training and information. The desired outcome was that in the future, fire prevention could become an integral part of community planning.

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INTRODUCTION

In 1997, the Port Angeles Fire Department lost 50% of it's fire prevention division staffing. This loss of staffing was the result of a department reorganization, prompted by a reduction in the department's operating budget. Shortly after the reorganization, the Fire Department completed its first five-year strategic plan. Identified in the plan was the need to provide new fire prevention programs to high risk groups not currently targeted by the fire department.

The fire prevention division was given the challenge of exploring alternative methods to deliver additional fire prevention programs without significantly impacting existing personnel. One alternative to the traditional delivery of fire prevention programs is the use of outside organizations.

The purpose of this research is three fold:

1. Identify age groups most vulnerable to fire-related death and injury;
2. Recommend program objectives to reduce fire death and injuries for the identified high risk age groups; and
3. Determine if outside organizations could assist the Fire Department in its efforts to deliver fire prevention programs to the identified high risk age groups.

The research method was both historical and descriptive. The questions to be answered are:

1. What age groups are the most susceptible to fire death and injury?

2. What factors influence an increased fire death and injury rate for the identified high risk age groups?

3. Could non-traditional organizations effectively assist the Fire Department in reducing fire death and injuries for the identified high risk groups?

BACKGROUND AND SIGNIFICANCE

In 1934, the Port Angeles Fire Department started an aggressive fire prevention program, Sparky Week, providing fire prevention education to all of the City's second grade students. Each second grade class was brought to the fire station where they were taught fire prevention practices targeted at their age group. Today Sparky Week continues, with many of our current second grader's parents and grandparents remembering their trip to the fire station. In addition to Sparky Week, the fire department currently provides:

- Station tours with fire prevention education for pre-school children,
- An annual fire prevention education program conducted during fire prevention week for the city's kindergarten through fourth grade classes, and

- A Fire Department open house with games and activities for children, each with a fire prevention theme.

Currently most of the department's ongoing public education efforts are directed at children, because teaching children fire prevention will result in safer adults in the future.

In the executive planning course at the National Fire Academy, the author learned that for a fire prevention program to be effective, it should be designed using a systematic approach. The systematic approach may involve:

- Identifying high risk fire victims and related high risk fire behaviors,
- Developing a fire prevention message content and format based upon the above high risk behaviors,
- Acquiring the necessary resources, both in materials and personnel,
- Evaluating the program(s) comparing baseline data.

While the Port Angeles Fire Department feels our current public education efforts are valuable, a systematic approach to planning will help ensure the departments limited resources are focused. Identifying the city's most important fire

problems and educating the high risk groups should result in lower associated fire deaths and injuries.

Until now, there has been a reluctance to identify high fire-risk target groups as the department doesn't have the personnel to add any additional public education programs. In 1997, the fire prevention bureau lost 50% of its staffing through a department reorganization. This reorganization was prompted by budget reductions due to the closure of Rayonier, one of the city's largest employers (Dawson, 1996).

Through knowledge gained at the National Fire Academy, the author learned that effective leaders occasionally think "outside the box" and use nontraditional methods to accomplish their department's mission.

One such alternative to the traditional fire department delivery of fire prevention programs discussed by students at the National Fire Academy is using outside organizations that are routinely in contact with identified high fire-risk groups. It was this discussion which prompted the author's research.

The research relates to the modules covered in the executive planning course as part of the executive fire officers program at the National Fire Academy. Module 3 - Project Management and Module 4 - Strategic Planning, were

used as a basis for the research project (National Fire Academy, 1996).

It is the author's intent, through this research, to provide the Port Angeles Fire Department information that will ensure the delivery of effective fire prevention programs targeted at reducing fire-related deaths and injuries.

LITERATURE REVIEW

Over 90% of Washington State's fire deaths occur inside a residence (Washington State Patrol and Washington State Association of Fire Chiefs, 1996). The author used literature that identified which age groups are dying in homes and why to assist in answering research questions one and two. The author also used literature to assist in answering research question three by examining other authors views and experiences on the use of nontraditional organizations to assist with fire prevention efforts.

High Fire-Risk Age Groups

A recent study conducted by the National Fire Protection Association identified pre-school children (age 5 and under) and older adults (age 65 and over) as experiencing a disproportionate number of fire deaths -- totaling more than half of all fire deaths experienced in the United States. The

study also indicated that the two identified high fire-risk age groups have been increasing their domination of home fire deaths for the past fifteen years (Hall, 1998). Other national studies substantiate Hall's findings as they also identify the very young and older adults as the groups at highest risk to die or be injured from the effects of fire -- between two to three times the fire death rate of the national average (National Fire Data Center, September 1977).

Washington State's latest annual report which outlines the State's fire trends, also identified older adults at highest risk for fire related deaths and injuries. Washington states fire-related casualty rate for older adults was more than double the rate for the State's general population. The report also identified the very young (age 4 and under) as having an above average fire related casualty rate (Washington State Association of Fire Chiefs, 1996).

Factors Influencing Fire-Risk

Most fire officials have been under the impression that the majority of fire deaths occur while the victim is sleeping, not during the day. While this may be true for most age groups, pre-school children have the highest percentage of fire deaths between the day time hours of 9 a.m. and 3 p.m., not at night (Hall, 1998).

As pre-school children are likely to be home during day time hours, the higher number of fire deaths could indicate they were unattended or unsupervised -- possibly acting out their curiosity about fire through the use of matches, lighters or other fire-related materials. Previous data collected support this possibility, as a high percentage of fires resulting in the deaths of young children were caused by children playing with fire (National Fire Protection Association, July 1996). The limited life experiences of young children also make them a likely high fire-risk group as they are unable to comprehend the consequences of their careless actions when playing with fire.

Low income neighborhoods have been identified as a greater problem for children playing with fire (Gunther, 1981). Low income households are less able to afford quality or reliable day care, with their children often spending greater periods of time unsupervised. Single parent households are at the highest risk of providing periods of unsupervised time for their children.

The risk of death or injury resulting from a child playing with fire is even greater in a household without an operational smoke detector. Even if an adult is present in another portion of the home, smoke alone may not alert the

adult until its too late to escape, especially if the adult is asleep (National Fire Data Center, June 1997).

With elderly adults, over half of the fires that resulted in death occurred between the hours of 6 p.m. and 9 a.m. -- when most people are asleep (Hall, 1998). Even though most fatal fires occur at similar times of the day for the elderly as the general population (Hall, 1998), the elderly are twice as likely to die from a fire than all other age groups (National Fire Data Center, June 1997).

Many elderly have a greater susceptibility to fire and burn injury due to their slowed-down reflexes, impaired senses, poor physical coordination and mobility problems. While the above represents their susceptibility, their increased vulnerability to death from the effects of a fire is attributed to their decreased ability to escape a fire, a diminished physiological ability to survive a serious injury and existing chronic health problems (National Criminal Justice Association, 1993). Due to the elderly’s increased susceptibility to fire, everyday activities such as cooking or smoking can become more dangerous as an older the individuals mental or physical capabilities decrease.

In four separate studies designed to provide information on the fire and burn problems of the elderly, the following

findings were identified (National Criminal Justice Association, 1993):

- One-half of the elderly's flame burn injuries involved smoking materials or matches (50% of these occurred while the victim was in bed).
- Cooking accidents were the second leading cause of fabric ignition fires, surpassed only by smoking materials.
- In general, the elderly were not aware of the causes and consequences of burn injuries and related preventative behaviors.

A subsequent report dedicated to reducing fire-related injuries and death among the elderly supported the findings of the 1993 National Criminal Justice Association report. The report identified the four leading causes of injury or death to elderly persons (NAHB, March 1990):

- Smoking related materials caused 25% of all fire related casualties.
- Cooking caused 20% of all fire related casualties.
- Heating caused 11% of all fire related casualties.
- Electrical systems caused 8% of all fire related casualties.

One factor identified in the literature review as contributing to fire fatalities for both high fire-risk age groups is the lack of early fire detection (smoke detectors). The National Fire Protection Association estimates that 93% of all households within the United States have smoke detectors (Douglas, 1998). Yet in approximately 50% of the fatalities involving young children no detector was present (Hall, 1998) and in 60% of the fatalities involving the elderly no detector was present (NAHB, March, 1990).

The Use of Non-Traditional Organizations for Fire Prevention

The fact that the United States has the highest fatality rate from fire of all industrialized nations can be attributed to it's resource priority of responding to fires, not preventing them (Osborne & Gaebler, 1992). It's no wonder that when communities experience an economic downturn, there is often a reduction in fire prevention efforts (Grant & Hoover, 1994). As stated previously, this was recently the case in Port Angeles as the fire department lost 50% of its prevention staffing.

To deal with the dilemma, progressive Chief Officers have sought out the assistance and support of various community based groups to assist in the funding and delivery of fire safety programs (Weathers, 1992). This strategy was supported

during the America Burning Revisited Workshop in 1987. It was recommended that fire departments recruit nontraditional agencies to assist with public education, recognizing that most prevention divisions are under-staffed (FEMA, 1987). Julius Halas, Chief of Sarasota Fire Department, reinforced the use of outside organizations stating, “By using multiple resources in a united effort to address common goals, much more can be accomplished -- rather than a single organization struggling on their own, often feeling as if they are going backwards” (Halas, 1994).

In addition to accomplishing more, using community based groups generates an increased public awareness and forms groups within the community that not only assist with fire prevention -- but practice it (Villella, 1984).

Outside organizations can also give prevention efforts acceptability and trust. In many areas, working with special organizations or associations can increase acceptance of the fire prevention program, allowing access to groups who otherwise would not respond to traditional methods of delivery (Douglas, 1998).

The literature review provided numerous examples of fire departments combining their prevention efforts with non-traditional outside organizations. It is important to note

that none of the examples noted a problem in the use of outside agencies.

There are numerous organizations within a community that not only have the capability to assist the fire department in prevention efforts, but also have a desire to assist. One of the best methods to find organizations that are available is the use of community directories. The author found the following community directories at the local Chamber of Commerce:

- Social Services Directory -- This directory identified social agencies within the community. The directory included information on the services offered by the agencies along with their addresses and telephone numbers.
- Clubs and organizations -- This directory identified organizations and clubs, most with special interests, and service organizations. Included are their addresses and phone numbers.
- Business directory -- This directory identifies the area’s businesses, educational facilities, health care facilities, and churches. The directory includes a business profile along with addresses and telephones numbers.

PROCEDURES

Introduction

In addition to the literature review, the author conducted a retrospective study of civilian fire casualties for the period between 1988 through 1998. The 10-year retrospective study included all fire related deaths and injuries in Port Angeles which were the result of a structure fire. The retrospective study was used to assist in answering research questions #1 and #2.

The author also gave a standardized questionnaire (Appendix B), along with the cover sheet (Appendix A), to a social service organization within Port Angeles. The social service organization, Clallam-Jefferson Community Action Council, provides existing services to low income adults over the age of 65. Twenty-eight questionnaires were returned from the group, representing 20% of Community Action's total client population. The questionnaire was used to assist in answering research question #3.

Retrospective Study

The Port Angeles Fire Department did not initiate a computer-based data collection system until 1997. Information prior to 1997 requires an individual to manually retrieve

information from the department's fire incident reports. Due to the length of the study (10 years), the fire casualty population was limited to those fires involving structures. Of those fires, information was retrieved as to civilian fire casualties and related fire causes.

Each non-fatal fire casualty admitted to a local hospital was provided with a follow-up through the receiving hospital to determine patient outcome. This was accomplished to determine if a patient later died as a result of fire related injuries.

Frequencies and percentages by age groups were used to characterize information obtained from the study. For comparative purposes, the age groups were similar to those used by the Washington State Incident Reporting System.

The results of the retrospective study acknowledged specific assumptions and limitations as the study only consisted of deaths or injuries received in fires involving structures. Fire casualties resulting from incidents not involving structures may have been left out.

Fire Prevention Questionnaire

The Fire Prevention questionnaire (Appendix B) contains the following client information:

Question 1 asked the survey participant the age of their client. *This question was used to allow discussion of inter-relationships of data in the survey based upon specific age groups.*

Question 2 asked the survey participant if another adult lived in the client's home. *This question was used to determine if another adult was available to assist the client in the event of an emergency.*

Question 3 asked the survey participant if there were any children present in their clients home who were between the ages of 0 and 5. *This question was used to ensure the survey participant identified homes that had children between the ages of 0 and 5.* If the above question was answered "yes," question 3a asked the survey participant if the children lived in a single parent home. *This question was used to identify the percentage of 0 through 5 year old children living in single parent homes.*

Question 4 asked the survey participant if their client has any physical disabilities which affects their mobility. *This question was used to determine if the client had disabilities which might effect their escaping a fire.*

Question 5 asked the survey participant is their client smokes. *This question was used to determine the percentage of clients who smoke.*

The fire prevention questionnaire also asked the following fire safety information:

Smoke detector assessment question asked the survey participant if their client had a smoke detector in their home. *This question was used to determine the percentage of clients who have smoke detectors installed in their homes.* If the above question was answered “yes,” questions a and b asked the survey participant if their client routinely tested their smoke detector and if the client’s smoke detector was functional at the time of the survey (this required the survey participant to test the smoke detector). *Questions a and b were used to determined the percentage of clients who routinely tested their smoke detectors and the percentage of clients with inoperable smoke detectors.*

The questionnaires were completed for the first 20% of the social service organizations client population (n=28). The questionnaires were completed consecutively to ensure the sample population was not selective and was representative of the organization’s total client population.

Frequencies and percentages were used to characterize responses to the questions in the survey.

The results acknowledge specific assumptions and limitations. For example, the survey consisted of only one social service organization which was randomly chosen. The results are not necessarily representative of other social service organizations servicing similar age groups.

RESULTS

Retrospective Study

The City of Port Angeles experienced 19 structure fires, producing 23 fire casualties between 1988 through 1998. Of the casualties, four resulted in a fatality (see Appendix C).

Of Port Angeles' fire casualties (n=23), 34% (n=8) were between the ages of 30 through 49, with 22% (n=5) between the ages of 50 through 64, followed by 13% (n=3) between the ages of 0 through 5. The remaining fire casualties were spread evenly throughout all other age groups as identified in Table 1. Fifty percent of all fatalities were over the age of 60 or under the age of 5 (see Appendix C).

Table 1

Fire Related Casualties by Age Groups, Port Angeles 1988 through 1998

Age	f	P
0 - 5	3	13
6 - 9	0	0
10- 19	1	4
20 - 29	2	9
30 - 49	8	34
50 - 64	5	22
65 +	2	9
Not reported	2	9
All groups	23	100

Note: f = frequency; P = percentages

From 1988 through 1998, the leading causes of fire related casualties in Port Angeles were smoking and cooking which accounted for 58% of all casualties. Children playing with matches or lighters and LP-gas were also significant causes, accounting for 22% of fire related casualties as indicated in Table 2.

Table 2

Causes of Fire Related Casualties, Port Angeles 1988 through 1998

Cause	f	P
Smoking	6	32
Cooking	5	26
Child Playing	2	11
LP-gas	2	11
Electrical	1	5
Other	3	15
All Causes	19	100

Note: f = frequency; P = percentages

The results of the retrospective study indicated 50% of all structure fires in Port Angeles which resulted in a casualty did not have an operable smoke detector. Twenty-five percent of the above structures did not have a smoke detector present, with the other 25% indicating a smoke detector was present but failed to operate as shown in Figure 1. Of those with inoperable smoke detectors, most were over the age of 60 as shown in Appendix C.

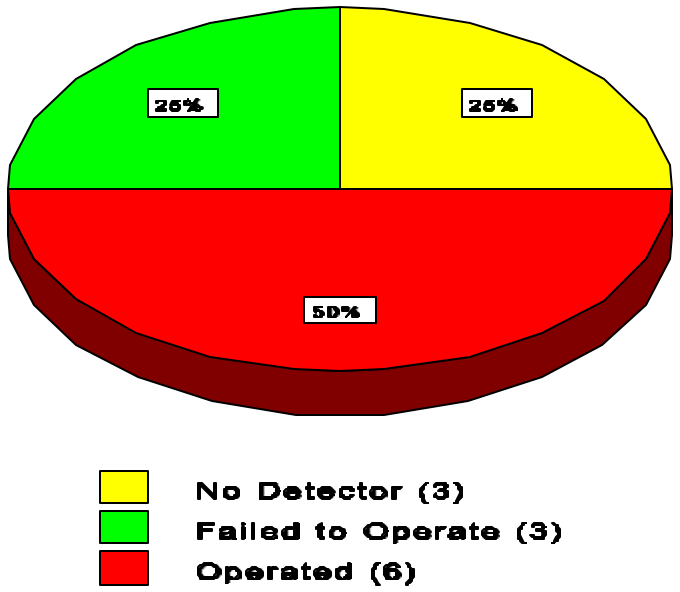

Figure 1. Smoke detector performance in structure fires with casualties, Port Angeles 1988 through 1998.

Retrospective Study Summary

Research question 1 -- Based upon the retrospective study, those residents of Port Angeles most likely to become injured in a structure fire are between the ages 30 through 64. Preschool children between the ages of 0 through 5 are the next most likely group to become injured as a result of a structure fire.

Preschool children between the ages of 0 through 5 and older adults between the ages of 60 and over are the most likely to die as a result of fire-related injuries. Each of the above groups also represent those who are most likely to have physical limitations which could affect their ability to escape when a fire occurs.

Research question 2 -- The retrospective study identified the leading cause of fire casualties for the high risk groups were smoking and cooking, accounting for nearly two-thirds of all structure fires involving a casualty.

The main cause of fire fatalities was children playing with matches or lighters, accounting for half of all Port Angeles' fatalities. Smoking came in second accounting for one-quarter of all fatalities.

The retrospective study identified half of Port Angeles' fire casualties occurred in homes where a smoke detector was not present, or was inoperable. The fire casualty age group most likely to live in a home without an operable smoke detector is those over the age of 60 -- those also most likely to have physical limitations which could slow their ability to escape from fire.

Fire Prevention Questionnaire

The client information section of the questionnaire was limited to individuals over the age of 65 as indicated by the results of survey question 1. *The social service organization used, Clallam-Jefferson Community Action Council, chose to distribute the questionnaire to employees who assist only older clients.*

All of the older adults surveyed (n=28) have a disability which could affect their mobility. The survey indicated 86% (n=24) of the older adults surveyed lived alone, with only 14% (n=4) living with another adult who could provide assistance in the event of an emergency as shown in Table 3.

The survey indicated 21% (n=6) of the older adults surveyed smoked as shown in Table 3.

Table 3

Clallam-Jefferson Community Action Council Client Information, Adult 65 Years and Older

Questionnaire Response (n=28)	f	P
Have physical disability affecting mobility	28	100
Live alone	24	86
Smoker	6	21

Note: f = frequency; P = percentage

The fire safety information for the questionnaire indicated that the older adults surveyed (n=28), 28% (n=8) did not have an operating smoke detector in their homes. Of the eight clients, 75% (n=6) had no detector present, with the remaining 25% (n=2) having a smoke detector that was inoperable as shown in Table 4.

Table 4

Questionnaire Response (n=28)	f	P
No smoke detector present	6	21
Smoke detector present - inoperable	2	8
Routinely test smoke detector [1]	14	50
Did not respond	6	21

Note: f = frequency; P = percentages
[1] At least once every six months

Of those surveyed (n=28), 50% (n=14) stated they routinely tested their smoke detectors. This response is questionable as many of the respondents are physically not capable of testing their smoke detectors, and one respondent's smoke detector was inoperable even though he stated he routinely tested it.

Questionnaire Summary

Research question 3 -- The social service organization chosen, Clallam-Jefferson Community Action Council, routinely provides assistance inside the homes of older adults, a portion of Port Angeles' high fire-risk population. The survey identified each of the older adults as having physical limitations which could affect their mobility -- those most at risk to experience problems during a fire. The social service organization also identified the majority of the older adults

as living alone -- without the assistance of another in the event of an emergency.

The survey identified almost one-third of the older adults serviced by the organization as having no operable smoke detector in their homes. The retrospective study supported this as it indicated the Port Angeles fire casualty age group most likely to live in a home without an operable smoke detector is those over the age of 60.

The social service organization chosen for this study was able to easily identify the lack of an operable smoke detector within their client's home. With a small amount of assistance and training, the same organization stated they could have installed a smoke detector or replaced the battery.

DISCUSSION

High Fire-Risk Age Groups

The retrospective study identified Port Angeles' preschool children and older adults at higher risk for dying in structure fires as they accounted for 50% of all fire fatalities. This is consistent with recent national and Washington state studies which also identified preschool children and older adults as those most likely to die as the

result of a structure fire (Hall, 1998 & Washington State Association of Fire Chiefs, 1996).

Of particular interest was the significantly higher number of 30 to 49 year old fire related casualties in Port Angeles as shown in Table 1. The results of the retrospective study were surprising as the literature review identified the very young and older adults at highest risk for non-fatal fire related casualties (National Fire Data Center, September, 1997 & Washington State Association of Fire Chiefs , 1996).

Factors Influencing Fire Risk

The research and literature review revealed comparative findings relative to factors that influence an increased fire death and injury rate. Table 2 indicated smoking and cooking as the leading causes of fire-related casualties in Port Angeles. The literature review also identified smoking and cooking as two leading causes of fire-related casualties for the nations older adults (National Criminal Justice Association, 1993 & NAHB, March, 1990).

Children playing with matches or lighters were identified in both the research and literature review as a significant factor in fire-related deaths involving children (National Fire Protection Association, July, 1996). Children playing with matches or lighters accounted for 50%, or one out of

every two fire deaths in Port Angeles between 1988 and 1998 as shown in Appendix C.

Both the research and literature clearly support a correlation between the lack of early fire detection (smoke detection), and fire related casualties. Even though 93% of all households in the United States have smoke detectors (Douglas, 1998), half of Port Angeles' fire casualties occurred in structures where no operable smoke detector was present as shown in Figure 1. This pattern was similar in the literature review which revealed that approximately half of all fatalities including young children and older adults occurred in homes without smoke detectors (Hall, 1998 & NAHB, March, 1990).

The Use of Non-traditional Organizations for Fire Prevention

The results of the questionnaire and literature review revealed that existing service organizations provide assistance to identified high fire-risk populations within Port Angeles. These organizations provide well established programs, often serving those populations which would otherwise be difficult for the fire department to reach.

Of the sample population (older adults) surveyed by the participating social service organization, 100% had a physical disability affecting their mobility as shown in Table 3. Of

those, the majority lived alone without the assistance of another adult. A recent report by the National Criminal Justice Association identified poor physical coordination and mobility problems as reasons for older adults increased vulnerability to fire (National Criminal Justice Association, 1993).

The sample population surveyed by the social service organization identified approximately one out of every four older adults as smokers as shown in Table 3. This finding is significant as both the research (Table 2) and the literature review identified smoking as a leading cause of fire-related casualties (NAHB, 1990 & National Criminal Justice Association, 1993).

Of importance is the social service organization's ability to determine if their client had a smoke detector, and if it was operable. Table 4 revealed that nearly one-third of the homes surveyed did not have an operable smoke detector. With an operable smoke detector increasing the chance of survival by two to three times (Douglas, 1998), it would appear that a smoke detector distribution program would decrease fire related deaths and injuries. The social service organization used for the survey stated that with a small amount of training, they could have easily installed or

replaced batteries in smoke detectors in the homes identified as needing smoke detection.

Organization Implications

The Port Angeles Fire Department currently provides fire prevention education activities for children ranging in ages from 4 to 12 years old. To increase effectiveness in reducing fire related deaths and injuries, the fire department needs to expand its prevention education efforts targeting the city's very young (0 - 5) and older adults (60 and over).

Effective prevention efforts would include programs targeted at reducing identified fire causes and providing early detection. Currently, this would require the addition of new fire prevention programs at a time when the fire department recently reduced its fire prevention division staffing by fifty percent.

To accomplish this, the fire department must seek nontraditional approaches to deliver new fire prevention programs. The author feels this methodology is supported in the research as an efficient method to provide fire prevention to the identified high fire-risk age groups.

RECOMMENDATIONS

The author recommends the Port Angeles Fire Department expand existing fire prevention efforts to include those age groups identified in the research as at greatest risk for fire related deaths and injuries. The age groups identified include preschool children (0 - 5 years) and adults 30 years and older.

The following are recommended program objectives to reduce fire death and injuries for the identified high fire-risk age groups.

- Develop a fire safety education program using a behavioral approach to produce measurable skills and knowledge. At a minimum, the program should educate preschool children about the proper behavior concerning matches and lighters, and educate adults about hazards associated with smoking and cooking.
- Increase the use of smoke detectors among high fire-risk age groups in Port Angeles by identifying homes without smoke detectors and facilitating their installation.
- Provide fire safety information regarding the proper use of LP-gas. This information could be provided during the final LP-gas permit inspection.

- Evaluate the programs effectiveness through a comparison of baseline data with post-program data. In those areas where baseline data is not available, bench marking should be used.

The author further recommends the Port Angeles Fire Department recruit and train service organizations to assist in program delivery. The service organizations chosen should already be providing services to high fire-risk age groups within Port Angeles. The fire prevention information would be added to their organization information and, with time, would become part of their community goals. Examples of organizations include:

SAFE KIDS Coalition
Area Agency on Aging
Social Clubs/Organizations
DSHS Offices
Headstart/ECAP
Senior Center
Churches
Salvation Army
Meals on Wheels (Community Action)
Daycares

Authors note: This study is the initial effort to bring together data to support community fire prevention planning. Age groups most at risk, major hazards and possible organizations for assistance have been identified. Obviously the next step will be to train service organizations that work

with at-risk populations. It is the hope of the author that fire prevention will eventually become an integral part of community planning.

REFERENCES

Dawson, M. (1996, October 22). City Cost at $1 Million Per Year. *Peninsula Daily News*, pp, A1, A5.

Douglas, M. (January 1998). Getting Smoke Detectors to Those Who Need Them. *Speaking of Fire.* p 8.

Federal Emergency Management Agency (1987). America Burning Revisited: *National Workshop November 30 – December 2, 1987.* Washington, DC: U.S. Government Printing Office.

Grant, N., and Hoover, D. (1994). *Fire Service Administration*. Quincy, MA: National Fire Protection Association.

Gunther, P. (May 1981). Fire Cause Patterns for Different Socioeconomic Neighborhoods in Toledo, Ohio: *Fire Journal.* 75, 52-58.

Hala, J. (1994, November). Forming Community Partnerships: For Safety's Sake! *The Voice.* 54.

Hall, John R. (1998). *Patterns of Fire Casualties in Home Fires by Age and Sex, 1991-95.* Quincy, MA: National Fire Protection Association.

NAHB National Research Center (March 1990). *Reducing Fire-Related Injury and Death Among the Elderly.* (Available from the NAHB Research Center, 400 Prince George's Boulevard, Upper Marlboro, Maryland 20772-8731.)

National Criminal Justice Association (1993). *Administration of the National Community Volunteer Fire Prevention Program.* Emmitsburg, MD: USFA.

National Fire Academy (1996). *Executive Planning Student Manual.* Emmitsburg, MD: National Fire Academy.

National Fire Data Center (June 1997). *Socioeconomic Factors and the Incidence of Fire.* (Available from the Federal Emergency Management Agency, publication number FA 170.)

National Fire Data Center (September 1997). *A Profile of Fire in the United States 1985 – 1994.* (Available from the Federal Emergency Management Agency, publication number FA 175.)

National Fire Protection Association (July, 1996). Presentation at the 1996 Fire and Life Safety Symposium, July 11, 1996.

Osborne, D., and Gaebler, T. (1992). *Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector*. New York: Addison-Wesley Publishing Co.

Villella, F. (May - June, 1984). The National Volunteer Fire Prevention Program: Community Partnerships Against Fire. *Building Standards.* 17 - 46.

Washington State Patrol and Washington State Association of Fire Chiefs. (1996). *Washington Incident Reporting System, 1996.* (Available from the Washington State Patrol, Fire Protection Bureau, P. 0. Box 4260, Olympia, WA 98504-2600).

Weathers, Thomas G. (1992). *Applied Life Safety Coalition Building or We All Came on Different Ships, But We Are in the Same Boat Now*. Emmitsburg, MD: National Fire Academy.

Appendix A

Survey Cover Letter

May 12, 1999

Dear Survey Volunteer,

I am currently participating in the National Fire Academy's Executive Fire Officer Program. This program requires the completion of a comprehensive research project on an issue which affects the community I serve, along with the fire service.

As part of my research, I choose to identify behaviors which influence the increased fire death and injury rate for older adults (65 and older) and the very young (0 to 4 years old), and determine if outside organizations could assist the fire department in its efforts to deliver fire prevention programs to the above mentioned high fire-risk age groups.

To complete my research, I have included questionnaires which will be useful in identifying high fire-risk conditions that may be present in homes your organization frequently visits.

Thank you for your time and assistance. Your participation will not only help fire departments make more informed decisions, but will also allow those departments to reduce fire related death and injuries for those at greatest risk.

If you have any questions or require additional information, you can contact me at 417-4653.

Sincerely,

Dan McKeen, Fire Marshal
Port Angeles Fire Department

Appendix B

Fire Prevention Questionnaire

Fire Prevention Questionnaire

Please check the appropriate response or fill in the blank for each of the following questions:

Organization Information

Please indicate the name of your organization

Client Information

4. What is the age of your client?

0 - 5 6 - 9 10 - 19 20 - 29 30 - 49
50 - 64 65 and over

2. Is there another adult living in the client's home? Yes No

3. Are there children present in the home between the ages of 0 and 5? Yes No

3a. If you answered "Yes" for #3, is your client's residence a single parent home?

Yes No

4. Does your client have any physical disabilities which may affect their mobility?

Yes No Don't know

5. Does your client smoke? Yes No Don't know

Fire Safety Information

Does your client have a smoke detector in their home? Yes No

If you answered "Yes," please answer questions #a and #b.

a. Does your client routinely check their smoke detector (at least once every six months)?

Yes No Don't know

b. Does your client's smoke detector operate at this time (test their smoke detector)?

Yes No

Appendix C

Fire Casualty Log

Port Angeles Fire Department
1988 - 1998 Fire Casualty Log

Date	Age	Fire Cause	Injuries	Outcome	Detector Performance
6/10/88	41	smoking	smoke inhalation	survived	Not reported
3/26/89	62	cooking	burns	survived	No detector present
4/27/89	35	cooking	burns	survived	operated
9/28/89	75	cooking	burns	survived	failed to operate
1/1/90	18	cooking	smoke inhalation	survived	Not reported
1/1/90	1	parent cooking	smoke inhalation	survived	Not reported
5/29/90	36	cooking	burns/smoke inhalation	survived	operated
6/15/90	29	smoking	burns/respiratory	survived	operated
12/17/90	2	child playing	burns	survived	present - unknown if operated
12/17/90	20	child playing	burns/smoke inhalation	fatality	present - unknown if operated
3/23/91	3	child playing	burns/asphyxia	fatality	operated

Date	Age	Fire Cause	Injuries	Outcome	Detector Performance
10/24/91	61	smoking	smoke inhalation	survived	Not reported
9/6/92	50	refueling vehicle [1]	burns	survived	Not reported
9/6/92	41	refueling vehicle [1]	burns	survived	Not reported
10/25/92		poor housekeeping	smoke inhalation	survived	operated
5/3/93	32	smoking	burns/smoke inhalation	survived	operated
11/20/93	31	LP-gas	burns	survived	No detector present
12/1/93	68	electrical	burns	survived	No detector present
12/1/93	60	electrical	burns/smoke inhalation	survived	No detector present
10/13/94		LP-gas	burns	survived	Not reported
3/12/95	47 - handicap	smoking	burns/respiratory involvement	survived	failed to operate
9/20/95	31	candle	burns/smoke inhalation	fatality	Not reported
7/20/96	63	smoking	burns/smoke inhalation	fatality	failed to operate

[1] Refueling occurred inside a garage

Date	Age	Fire Cause	Injuries	Outcome	Detector Performance